DVI Matrix Switcher 4x4 CSW-DVI440A
User Manual

Please read this manual carefully before using this product.

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Call toll free: 800 526-0242 email: customerservice@comprehensivecable.com

SAFETY PRECAUTIONS

Please read all instructions before attempting to unpack, install or operate this equipment and before connecting the power supply.

Please keep the following in mind as you unpack and install this equipment:

• Always follow basic safety precaution to reduce the risk of fire, electrical shock and injury to persons.

• To prevent fire or shock hazard, do not expose the unit to rain, moisture or install this product near water.

• Never spill liquid of any kind on or into this product.

• Never push an object of any kind into this product through any openings or empty slots in the unit, as you may damage parts inside the unit.

• Do not attach the power supply cabling to building surfaces.

• Use only the supplied power supply unit (PSU). Do not use the PSU if it is damaged.

• Do not allow anything to rest on the power cabling or allow any weight to be placed upon it or any person walk on it.

• To protect the unit from overheating, do not block any vents or openings in the unit housing that provide ventilation and allow for sufficient space for air circulate around the unit.

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1. Introduction

1.1 About DVI Matrix Switcher System

CSW-DVI440A Matrix switcher is a high-performance digital signal switcher that can be used for cross switching of multi computer and audio signal. Independent DVI component and I/O terminals make each component signal transmit and switch separately; this design can reduce attenuation of signal transmission to minimum and output the image and audio signal in high-fidelity quality.

CSW-DVI440A switcher mostly apply in broadcasting TV engineering, multi-media meeting room, big screen display engineering, television education, command control center or other fields. A/V timing or separating switching function. With RS232 interface, it can be worked with PC, remote control system and any other far-end control system devices.

2. CSW-DVI440A Packing of the Product

	DVI Matrix Switcher
	IR remote
	RS-232 Communication Cord
	Power Supply Cord
	CD
	User Manual and Quality Guarantee

3. DVI Installation

DVI matrix switchers adopt metal shell and can be stacked with other device. Moreover, they are rack-mountable enclosure and can be installed in the standard 19 inches case.

4. Front View and Rear View of the Product

4.1 Front view of CSW-DVI440A

4.2 Rear view of CSW-DVI440A

5. External Connection

5.1 Introduction of the Input and Output Connectors

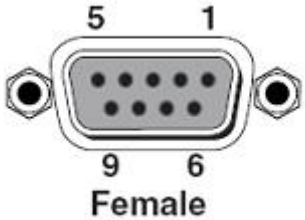
According to different type of matrix, computer signal I/O interface are made up of 4-channel HDMI ports and DVI-D female ports respectively (digital audio included). Please refer to shell silk-screen figure about other types of interface.

5.2 Connection of RS-232 Communication Port

Except the front control panel, the DVI matrix switcher can be control by far-end control system through the Ethernet control via the RS-232 communication port.

5.2.1 Connection with Control System

With the RS-232 port, the DVI matrix switchers can be control by several kinds of control systems.



This RS-232 communication port is a female 9-pin D connector. The definition of its pins is as the table below.

No. Pin Function

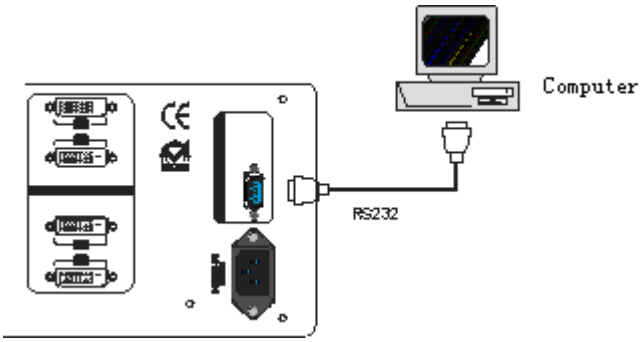
1	N/u	Unused
2	Tx	Transmit
3	Rx	Receive
4	N/u	Unused
5	Gnd	Ground
6	N/u	Unused
7	N/u	Unused
8	N/u	Unused
9	N/u	Unused

F 5-1 9HDF

5.2.2 Connection with Computer

When the switcher connects to the COM1 or COM2 of the computer with control software, users can control it by that computer.

To control the switcher, users may use the public COM software. Please refer the details in Communication Protocol and Command Codes

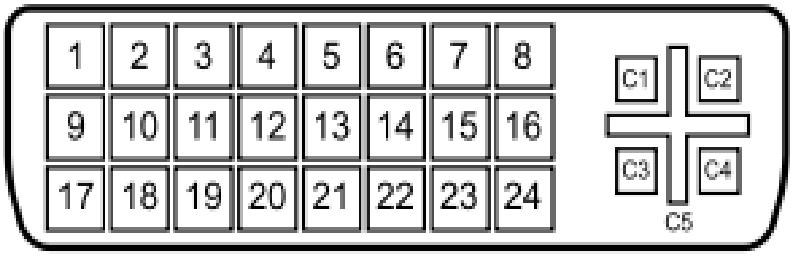


F 5-2 MHD connecting to computer

5.3 How to Connect with the Input and Output Terminals

The DVI matrix switchers may take DVD players, computers, graphic workstations and digital showing platform as their input signal source, and projectors, video recorders, displayers and amplifiers as their output signal destinations according to different situation.

DVI-I Dual Link:



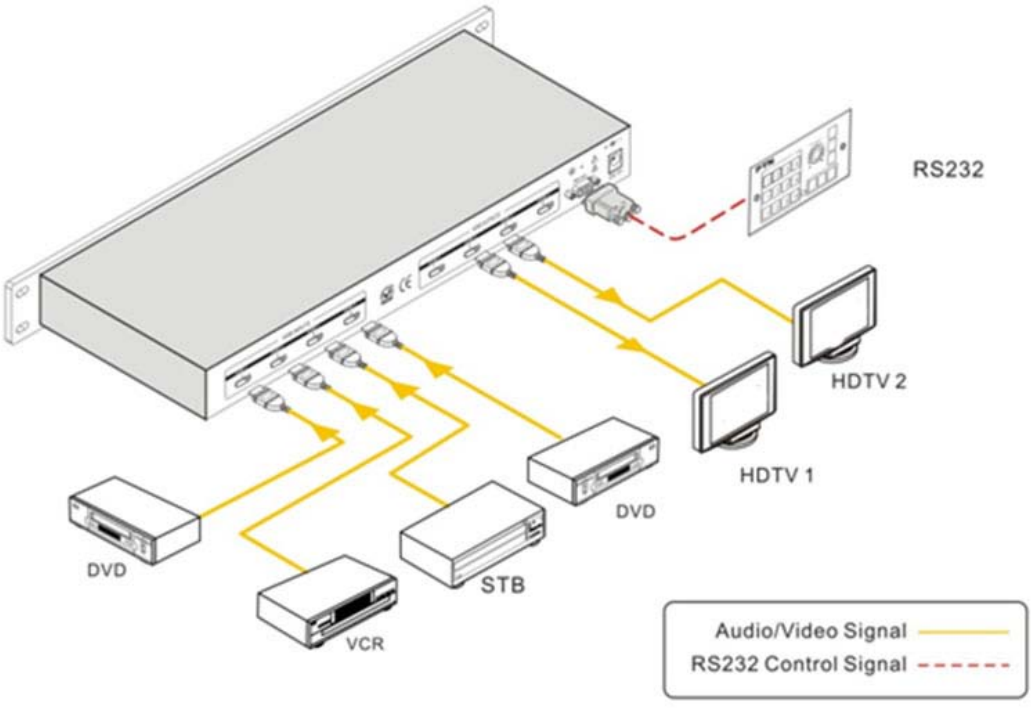
F5—3 DVI-I Dual Link port

DVI pin function

PIN	FUNCTION	PIN	FUNCTION
1	T.M.D.S.Data2-	13	T.M.D.S.Data3+

2	T.M.D.S.Data2+	14	+5V Power
3	T.M.D.S. Data 2/4 Shield	15	Ground (for +5V)
4	T.M.D.S. Data 4-	16	Hot Plug Detect
5	T.M.D.S. Data 4+	17	T.M.D.S. Data 0－
6	DDC Clock	18	T.M.D.S. Data 0+
7	DDC Data	19	T.M.D.S. Data 0/5 Shield
8	No Connect	20	T.M.D.S.Data5－
9	T.M.D.S.Data1-	21	T.M.D.S.Data5＋
10	T.M.D.S.Data1+	22	T.M.D.S. Clock Shield
11	T.M.D.S.Data1/3 Shield	23	T.M.D. S. Clock +
12	T.M.D.S.Data3-	24	T.M.D.S .Clock－

System Diagram：



F5-4 DVI matrix system connection

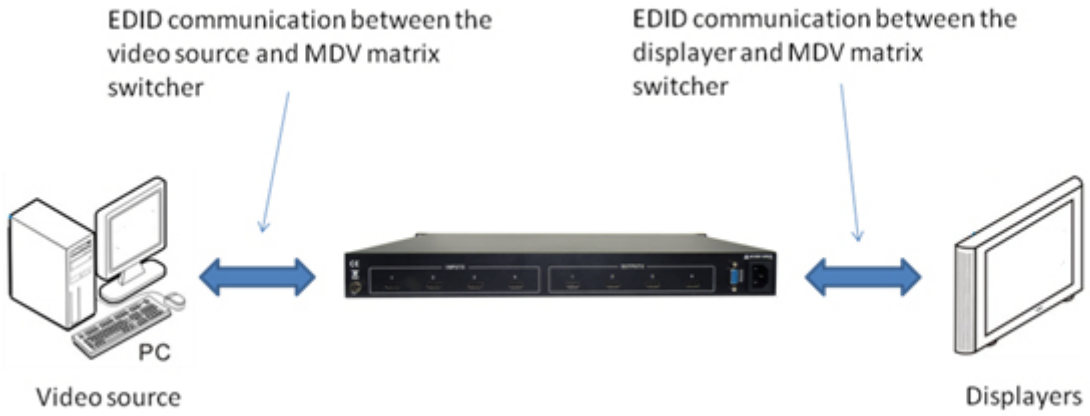
6. Operation of the EDID management

CSW-DVI440A matrix switcher is built in the EDID management database. The EDID management can be automatically shake hand, or manual exchanged, and factory restore.

6.1 EDID automatically shake hand

The CSW-DVI440A matrix switcher is built in the EDID data, which can communicate with the displayers and video source automatically. When the displayers or video sources are connected to the CSW-DVI440A matrix switcher, they will share the EDID/DDC information with the matrix switcher.

The communication solution is like this:


EDID communication between the video source and MDV matrix switcher
EDID communication between the displayer and MDV matrix switcher
PC
Video source
Displayers

The CSW-DVI440A EDID database includes most popular displaying data, but not all the displaying data because of the capability and firmware limitation. So, we can manually refresh the EDID data to update the EDID data base.

6.2 EDID management of CSW-DVI440A

The RS232 commands for EDID management of CSW-DVI440A include: ”EDIDMon.” & ”EDIDMoff.” (Please notice the text-transform, and the dot in behind.)
These two commands only accept by CSW-DVI440A, in the other CSW-DVI440A matrix models they are unavailable.

6.2.1 Erase and Refresh the EDID data

When the “EDIDMOn.” is sent, CSW-DVI440A will auto copy the mix EDID data of all outputs. It means the CSW-DVI440A will erase the old EDID data, and copy the EDID data which all output displays have.

6.2.2 EDID restore to factory default

When we send the “EDIDMoff.” to the CSW-DVI440A matrix switcher, it will recover the factory default EDID data.

6.2.3 RS232 feedback:

When the “EDIDMOn.” or “EDIDMoff.” is correctly sent, all the connected displayers will be blank for 2~3 seconds and recover again. And, CSW-DVI440A will send out a RS232 feedback command “EDIDMOn.” or “EDIDMoff.”.

7. Operation of the Control Panel

7.1 Front Panel Description

“AV” AV synchronal button: To transfer video and audio signal synchronously by the switcher
Example: To transfer both the video and the audio signals from input channel No.3 to output channel No.4.
Operation: Press buttons in this order “AV”,“3”,, “4””.

“VIDEO” Video button: To transfer only video signals from input channel to output channel
Example: To transfer video signals from input channel No.3 to output channel No.4.
Operation: Press buttons in this order “VIDEO”, “3”, “4”.

“AUDIO” Audio button: To transfer only audio signals from input channel to output channel
Example: To transfer audio signals from input channel No.2 to output channel No.3.
Operation: Press buttons in this order ““AUDIO”, “2”, “3””.

“1,2,3,4” I/O Keypads: Keys to select I/O channels.
Example: To transfer input channel No.3 to output channel No.1
Operation: Press buttons in this order: “3” in INPUT area, “1” in OUTPUT area.

7.2 Command Format of the Switching Operation

With the front control panel, the switcher could be control directly and rapidly by pressing the buttons under below format.

“Menu” +“Input Channel” +“Output Channel 1”

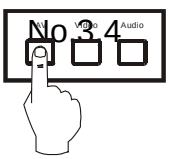
“Menu”: “AV”, “Audio”, “Video”

“Input Channel”: Fill with the number of input channel to be controlled

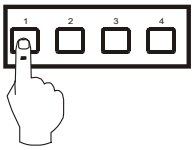
“Output Channel”: Fill with the number of output channels to be controlled

7.3 Examples of Operation

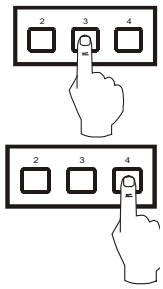
Example 1 : To transfer video and audio signals from input channel No.1 to output channel No.4.



1, Press the button for switching mode “AV” for the switching mode of video and audio (“Audio” for the switching mode of audio only; “Video” for the switching mode of video only)



2, Press the button for input channel number“1”



3, Press the button for the first output channel number “3”

„

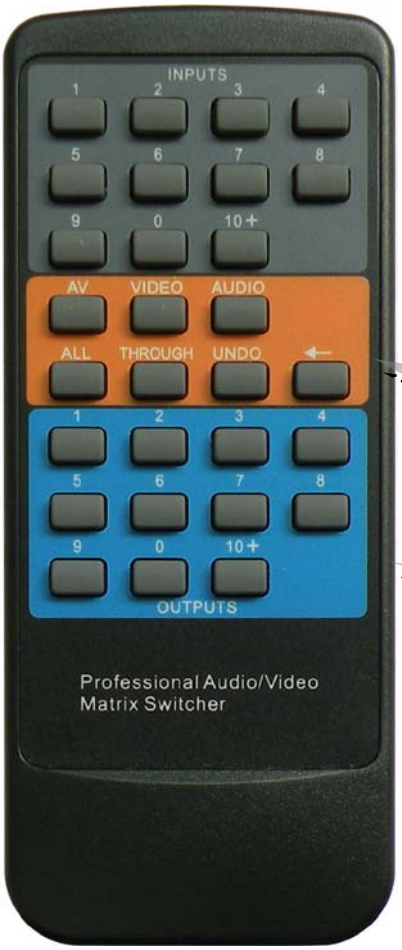
4, Press the button for the second output channel number “4”

Then, switching OK! audio/video switching from “1” to “3” and “4”

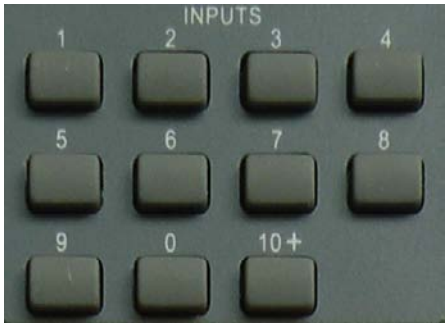
8. Usage of the Remote Controller

With the infrared remote controller, the matrix switcher could be control remotely. Because the function buttons on the remote controller are the same with the ones on the front control panel, the remote controller shares the same control operation and command format with the control panel.

☐ 3 steps Operation

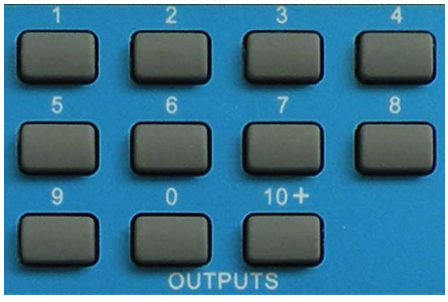


The inputs channels, from 0~9, and plusing “10+” for more



Menu, for switching source and function

The outputs channels, from 0~9, and plusing “10+” for more



9. Communication Protocol and Command Codes

With this command system, the RS232 software is able to control and operate the CSW-DVI440A Matrix with remotely.

Communication protocol:

Baud rate: 9600 Data bit: 8 Stop bit: 1 Parity bit: none

Command Types	Command Codes	Functions
System Command	/*Type;	Inquire the models information.
	/%Lock;	Lock the keyboard of the control panel on the Matrix.
	/%Unlock;	Unlock the keyboard of the control panel on the Matrix.
	/^Version;	Inquire the version of firmware
	/:MessageOff;	Turn off the feedback command from the com port. It will only show the “switcher OK”.
	/:MessageOn;	Turn on the feedback command from the com port.
	EDIDMOn.	Enable auto EDID management.
	EDIDMOff.	Disable auto EDID management.
	Undo.	To cancel the previous operation.
	Demo.	Switch to the “demo” mode, 1->1, 2->2, 3->3 … and so on.
Operation Command (PTN2.0 Command System)	[x1]All.	Transfer signals from the input channel [x1] to all output channels
	All#.	Transfer all input signals to the corresponding output channels respectively.
	All$.	Switch off all the output channels.
	[x1]#.	Transfer signals from the input channel [x1] to the output channel [x1].
	[x1]$.	Switch off the output channel [x1].
	[x1] V[x2].	Transfer the video signals from the input channel [x1] to the output channel [x2].
	[x1] V[x2],[x3],[x4].	Transfer the video signals from the input channel [x1] to the output channels [x2], [x3] and [x4].
	[x1] A[x2].	Transfer the audio signals from the input channel [x1] to the output channel [x2].
	[x1] A[x2],[x3],[x4].	Transfer the audio signals from the input channel [x1] to the output channels [x2], [x3] and [x4].
	[x1] B[x2].	Transfer both the video and the audio signals from the input channel [x1] to the output channel [x2].

	[x1] B[x2],[x3],[x4].	Transfer both the video and the audio signals from the input channel [x1] to the output channels [x2], [x3] and [x4].
	[x1]P[g].	Transfer both the video and the audio signals from the input channel [x1] to the output group [g].
	[g]PP[x2],[x3],[x4].	Together the output channels [x2], [x3] and [x4] to the output group [g].
	S[g].	Inquire the output channels of output group [g].
	Status[x1].	Inquire the input channel to the output channel [x1].
	Status.	Inquire the input channel to the output channels one by one.
	Save[Y].	Save the present operation to the preset command [Y]. [Y] ranges from 0 to 9.
	Recall[Y].	Recall the preset command [Y].
	Clear[Y].	Clear the preset command [Y].

Note:

1. [x1], [x2], [x3] and [x4] are the symbols of input or output channels ranged according to the model of the matrix switcher. If the symbols exceed the effective range, it would be taken as a wrong command.
2. In above commands, "["and "]" are symbols for easy reading and do not need to be typed in actual operation.
3. Please remember to end the commands with the ending symbols "." and ";".

Detail Examples:

1、 Transfer signals from an input channel to all output channels: [x1]All.
Example: To transfer signals from the input channel No.3 to all output channels. Run Command: "3All."

2、 Transfer all input signals to the corresponding output channels respectively: All#.
Example: If this command is carried out on an MVG1616-A matrix switcher, the status of it will be: 1->1, 2->2, 3->3, 4->4……16->16.

3、 Switch off all the output channels: All$.
Example: After running this command, there will be no signals on all the output channels.

4、 Check the version of the firmware: /^Version;
To check the version of the firmware.

5、 Switch off the detail feedback command from the COM port: /:MessageOff;
Switch off the detail feedback information from the COM port. But, it will leave the "switch OK" as the feedback, when you switch the matrix.

6、 Switch on the detail feedback command from the COM port: /:MessageOn;
Switch on the detail feedback information from the COM port. it will show the detail switch information when it switch. Example: when switch 1->2 for Audio, it will feedback "A0102".

7、 Transfer signals from an input channel to the corresponding output channel: [x]#.
Example: To transfer signals from the input channel No.5 to the output channel No.5. Run Command: "5#."

8、Switch off an output channel: [x]$. Example: To switch off the output channel No.5. Run

Command: “5$.”

9、Switch both video and audio signals synchronously: [x1] B[x2].

Example: To transfer both the video and the audio signals from the input channel No.120 to the output channel No.12,13,15. Run Command: “120B12,13,15.”

10、Transfer both the video and audio signals from input channel [x1] to output group [g]: [x1]P[g].

Example: If together the output channel NO.1,3,5,7 to output group NO.2 by sent the command “2PP1,3,5,7.”, then when send the command “1P2.”, the matrix will transfer both the video and the audio signals from the input channel No.1 to output channel NO.1,3,5,7.

When you want to make a group [g], you should clear this group first. The command for clear group is “[g]P0.”.

11、Inquire the input channel to the output channel [x]: Status[x].

Example: To inquire the input channel to the output channel No.23. Run Command: “Status23.”

12、Inquire the input channel to the output channels one by one: Status.

Example: To inquire the input channel to the output channels one by one. Run Command: “Status.”

13、Save the present operation to the preset command [Y]: Save[Y].

Example: To save the present operation to the preset command No.7. Run Command: “Save7.”

14、Recall the preset command [Y]: Recall[Y].

Example: To recall the preset command No.5. Run Command: “Recall5.”

15、Clear the preset command [Y]: Clear[Y].

Example: To clear the preset command No.5. Run Command: “Clear5.”

10. Specification

Video Input		Video Output	
Input	DVI	Output	DVI
Input Connector	Female DB24+5	Output Connector	Female DB24+5
Input Level	T.M.D.S. 2.9V/3.3V	Output Level	T.M.D.S. 2.9V/3.3V
Input Impedance	75Ω	Output Impedance	75Ω
Video General			
Gain	0 dB	Bandwidth	340 MHz (10.2 Gbit/s)
Video Signal	DVI 1.0 standard DVI-D full digital T.M.D.S signal	Max Time-delay	5nS (±1nS)
Crosstalk	<-50dB@5MHz	Switching Speed	200ns (Max.)
EDID and DDC Management	Supports Extended Display Identification Data (EDID) and Display Data Channel (DDC) data using DVI and HDMI standards, EDID and DDC signals are actively buffered. The built-in EDID/DDC database can analyze these two signals, mix them, and realize the handshake of them internally.		
HDCP Management	Compliant with High-bandwidth Digital Content Protection (HDCP) using DVI and HDMI 1.3 standards. The built-in HDCP management technology can analyze HDCP key, and realize the handshake internally.		
Audio General			
Frequency Response	20Hz ~ 20KHz	CMRR	>90dB@20Hz~20KHz
Stereo Channel Separation	>80dB@1KHz	THD + Noise	1%@1KHz, 0.3%@20KHz at nominal level
Control Parts			
Serial Control Port	RS-232, 9-pin female D connector	Pin Configurations	2 = TX, 3 = RX, 5 = GND
IR Remote	Default IR remote	Front Panel Control	Buttons
Options	TCP/IP control by PTNET(PTN's programmable interface)		
General			
Power Supply	100VAC ~ 240VAC, 50/60Hz	Power Consumption	25W
Temperature	-20 ~ +70℃	Humidity	10% ~ 90%
Case Dimension	W483 x H44 x D235mm (1U high, full rack wide)	Product Weight	1.5Kg

11. Troubleshooting & Maintenance

1) When the output image in the destination device connected to the DVI Matrix (CSW-DVI440A) has ghost, such as the projector output with ghost, please check the projector's setting or try another high quality connection cord.

2) When there is a color losing or no video signal output, , Maybe the DVI cables haven't been connected as DVI criterion

3) When the remote controller doesn't works:
   A. Maybe the battery is run out of, please change a new one.
   B. Maybe the controller is broken, please ask the dealer to fix it.

4) When user can not control the DVI Matrix (CSW-DVI440A) by computer through its COM port, please check the COM port number in the software and make sure the COM port is in good condition.

5) If there is not "beep" sound when switching the I/O signal, please make sure the beeper is switched-on. If so, the beeper inside the matrix may be broken. Please send it to the dealer for fixing.

6) When switching , the beeper beeps but without any output image：

   A. Check with oscilloscope or multimeter if there is any signal at the input end. If there is no signal input, it may be the input connection cord broken or the connectors loosen.
   B. Check with oscilloscope or multimeter if there is any signal at the output end. If there is no signal output, it may be the output connection cord broken or the connectors loosen.
   C. Please make sure the destination device is exactly on the controlled output channel
   D. If it is still the same after the above checking, it may be something wrong in the switcher. Please send it to the dealer for fixing.

7) If the output image is interfered, please make sure the system is earthed well.

8) If the static becomes stronger when connecting the DVI connectors, it may be due to the incorrect earthling of the power supply, Please earth it again correctly, and otherwise it would bring damage to the switcher or shorten its natural life.

9) If the Matrix cannot be controlled by the keys on the front panel, RS232 port or remote controller, the host may has already been broken. Please send it to the dealer for fixing.

55 Ruta Ct. South Hackensack, NJ 07606
Toll Free: **800 526-0242**
email:
sales@comprehensivecable.com
customerservice@comprehensivecable.com

www.comprehensivecable.com